



VERIFICATION OF TRANSLATION

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Japan, hereby certify that I am the translator of the documents
attached and I state that the following is a true translation
to the best of my knowledge and belief of Japanese Patent
Application No. 9-335451 filed on December 5, 1997 in the name
of Minnesota Mining and Manufacturing Company.

Dated this 30th day of March, 2005

Signature of translator

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[NAME OF DOCUMENT] SPECIFICATION

[TITLE OF THE INVENTION] Oil Cleaning Sheets for Makeup

[SCOPE OF CLAIM FOR PATENT]

[CLAIM 1]

An oil cleaning sheet for makeup, characterized by comprising a porous stretched film made of a plastic material.

[CLAIM 2]

An oil cleaning sheet for makeup according to claim 1, characterized in that the interstitial volume per unit area of said porous stretched film is in the range of 0.0001-0.005 cm³ as calculated by the following equation:

interstitial volume per unit area = [film thickness (cm) x 1 (cm) x 1 (cm) x void content (%)] / 100

(where the void content is the percentage of voids in the porous film).

[CLAIM 3]

An oil cleaning sheet for makeup according to claim 1 or 2, characterized in that the void content of said porous stretched film is in the range of 5-50% and the film thickness is in the range of 5-200 μm.

[DETAILED DESCRIPTION OF THE INVENTION]

[Field of Utilization in Industry]

The present invention relates to an oil cleaning sheet for makeup, and more specifically it relates to an oil cleaning sheet in the form of strip for wiping off skin oil (sebum) which has surfaced on the face. The oil cleaning sheet of the invention has excellent oil absorbance, allows the condition of oil to be easily assessed when applying makeup and causes little skin irritation, while its facial cleansing effect is excellent, thus facilitating application and spreading of cosmetics.

[Prior Art]

Various types of oil cleaning sheets for makeup are well known, for wiping off oils which surface on different parts of the face, especially the nose, cheeks, forehead and eyebrows, to maintain a clean face and to facilitate application and

spreading of cosmetics. When makeup is applied over oils which have surfaced on the face, the cosmetic material fails to properly adhere to the skin, thus impeding its spreading and preventing adequate performance of the effect of the makeup. An additional effect can be exhibited after makeup is applied, to prevent crumbling of the makeup or "oily appearance", by using oil cleaning sheets to wipe off oils which constantly surface on the skin after application of makeup.

The most widely used type of oil cleaning sheets among the many kinds of oil cleaning sheets are those obtained by making paper from oil absorbing plant fibers such as hemp or synthetic pulp. Sheets made from these paper materials, however, while having high oil absorption, also have a disadvantage of high irritation to skin as a result of the hardness and surface roughness of the fiber materials used. In order to overcome this irritation to the skin, high-compression roller pressing is carried out during production of the oil cleaning sheets, or the surface of the paper may be coated with an inorganic powder such as calcium carbonate powder along with a sizing agent. However, in the former case there is again the disadvantage of skin irritation, because the fibers smashed by the roll pressing become raised over time, while in the latter case a disadvantage results in that the surface of the paper becomes covered with the sizing agent, unavoidably lowering the oil absorbing power.

Japanese Unexamined Utility Model Publication (Kokai) No. 4-45591 is aimed particularly at solving the problems caused by roll pressing during production of oil cleaning sheets and by coating of paper surfaces with inorganic powders such as calcium carbonate powder, and it teaches adhesion of porous globular beads onto the surface of oil cleaning sheets. According to this proposal, adhesion of porous globular beads provides an effect of allowing efficient absorption of skin oils.

Also, Japanese Unexamined Patent Publication (Kokai) No. 6-319664 teaches improvement in skin oil absorption by adding

(B) an inorganic filler to (A) a raw pulp material composed mainly of plant fiber for preparation of a paper making material, to make sheets with a paper hardness of at least 0.7 (g/cm²).

The oil cleaning sheets produced by the methods taught in these publications are effective at reducing irritation to skin during their use. However, the improvement in skin oil absorption with these oil cleaning sheets is limited, and further improvement is therefore desired. These oil cleaning sheets also have an additional problem in that the state of oil absorption of skin oils, i.e. the wiping effect cannot be easily and accurately assessed during their use. The difficulty in assessing the wiping effect means that the user cannot achieve satisfaction by the removal of skin oils from the face. That is, from the point of view of the user, it is a very important evaluating factor to determine whether and how much skin oils have been removed from the face of the user when the oil cleaning sheets are used, and therefore satisfaction with makeup application varies greatly depending on this factor.

There also exist publicly known oil cleaning sheets for makeup which especially focus on allowing easy assessment of the wiping effect on skin oils, as discussed above. For example, Japanese Examined Patent Publication No. 56-8606 teaches an oil cleaning sheet for makeup which is characterized by mixture of hemp fibers with polyolefin resin fibers in an amount of 10-70% by weight and preparation of sheets with a density of 12-50 g/cm². Because these oil cleaning sheets have a construction with transparent-like polyolefin fibers mixed with non-transparent hemp fibers, the hemp fibers which are non-transparent prior to use exhibit a transparent-like property upon absorption of oil, thus allowing the skin oil wiping effect to be clearly assessed.

In addition, Japanese Unexamined Utility Model Publication (Kokai) No. 5-18392 discloses oil cleaning sheets characterized in that inorganic or organic particulate bodies

such as clay particles, fine silica particles, fiber powder or the like are added to oil cleaning paper to form a smooth side on the surface of the oil cleaning paper. Since these oil cleaning sheets contain particles in the gaps between the fibers of the oil cleaning paper, skin oils moisturize the entirety of the oil cleaning sheet while also filling the gaps between the paper fibers and the particles, providing an effect of rendering the oil cleaning paper even more transparent, i.e. giving the user a "satisfaction that skin oil has been removed".

Nevertheless, although the 2 types of oil cleaning sheets mentioned above exhibit certain degrees of effects of transparency by oil absorption and assessment of oil absorption thereby, as a drawback they have a reduced amount of oil absorption which is the most important aspect for oil cleaning sheets, and it is difficult to achieve full transparency of the oil cleaning sheets upon oil absorption. Consequently, there still remains a demand for oil cleaning sheets with even greater oil absorption which can also be rendered transparent to give adequate satisfaction to users.

Another problem which is common to conventional oil cleaning sheets arises from the fact that they are made from paper types produced as thin paper from fiber materials, and thus they tend to be easily damaged when the user employs them to wipe skin oils from the face and must be immediately replaced. Because of the high cost of commercially available oil cleaning sheets, it is desirable to provide tougher oil cleaning sheets which do not need such immediate replacement. [Problems to be Solved by the Invention]

The present invention has been accomplished in the light of the many problems with conventional oil cleaning sheets for makeup which have been discussed above, and its object is that of providing an improved oil cleaning sheet for makeup which has excellent oil absorption, is resistant to damage during use, allows clear assessment of the oil absorbing effect by becoming transparent upon oil absorption to thus provide the user with a feeling of adequate wiping and a sense of

satisfaction, has an agreeable feel, and which does not require inclusion of particulate bodies on the surface for improved characteristics.

[Means for Solving the Problems]

According to the present invention, the above-mentioned object may be achieved by an oil cleaning sheet for makeup characterized by comprising a porous stretched film made of a plastic material.

The porosity of the interstitial volume per unit area stretched film made of a plastic material as a constituent of the oil cleaning sheet for makeup according to the invention is preferably in the range of 0.0001-0.005 cm³ as calculated by the equation:

interstitial volume per unit area = [film thickness (cm) x 1 (cm) x 1 (cm) x void content (%)] / 100

(where the void content is the percentage of voids in the porous film).

The "void content" is more specifically defined as the percentage of an amount of filling material, when all of the voids of the porous film are filled with a material of the same composition as the film, with respect to a film with no corresponding voids.

The void content of the porous stretched film is preferably in the range of 5-50% and the film thickness is preferably in the range of 5-200 μm.

[Preferred Embodiment of the Invention]

The oil cleaning sheet for makeup according to the invention is characterized by employing as the paper body a plastic material as opposed to paper material such as used in conventional oil cleaning sheets, and preparing a porous stretched film with that material. The porous stretched film of the invention may be produced by various different methods using the plastic material as the starting substance, but preferably it is produced by adding a filler to a highly transparent crystalline thermoplastic resin as the starting material for film making to prepare a plastic film, and then

stretching the film to create fine voids therein.

The porous stretched plastic film obtained in this manner has a larger percentage of voids constituting the volume of the sheet compared to conventional oil cleaning sheets, and therefore it has excellent absorption of skin oils on the skin surface and thus a considerably higher amount of oil absorption per unit area. Also, since the plastic film has a structure with a uniform content of many fine voids, prior to wiping of skin oils from the skin surface it appears non-transparent due to light dispersion, but after oil absorption the oils fill each of the voids thus either preventing or reducing the degree of light dispersion, and this together with the original transparent nature of the film body allows the oil absorbing effect to be clearly assessed.

Preferred examples of highly transparent crystalline thermoplastic resins to be used as the main starting material for production of the porous unstretched plastic film of the invention include, but are not limited to, high density polyethylene, polypropylene, polybutylene, poly-4-methylpentene and ethylene-propylene block copolymer, while modified polypropylene is ideal because of its melt strength for film making.

Preferred examples of fillers to be used in combination with the aforementioned thermoplastic resin to provide the fine voids include, but are not limited to, mineral oils, glycerin, petroleum jelly, low molecular weight polyethylene, polyethylene oxide, polypropylene oxide, polytetramethylene oxide, soft Carbowax and mixtures thereof, because these exhibit transparency upon absorption of oil. Mineral oils are preferred among these fillers because of their relatively low cost.

The aforementioned fillers can be varied within a wide range in the starting material used for production of the film. The amount of filler to be used is preferably in the range of 20-60% by weight, and more preferably 25-40% by weight of the starting material. If the amount of filler added to the starting material is under 20% by weight, the

void content of the film resulting after stretching is reduced, thus lowering the amount of oil absorption, while if it is above 60% by weight it becomes more difficult to produce films, and only brittle films can be obtained.

Other additives may also be added as necessary in addition to the thermoplastic resin and filler in the main starting material for production of the porous stretched plastic film. For example, an organic nucleating agent may be added to facilitate crystallization of the main starting material. As suitable nucleating agents there may be mentioned, for example, organic acids such as carboxylic acid, sulfonic acid and phosphonic acid, and organic alcohols. As additional suitable additives there may be mentioned, for example, inorganic and organic pigments, aromatic agents, surfactants, antistatic agents and the like.

The main starting material and optional additives are melted and combined to form a film, producing a filler-containing plastic film. The melting and mixing step and the subsequent film forming step may be carried out according to common methods. An example of a suitable melt mixing method is kneading with a kneader, and examples of suitable film forming methods are the inflation method and the casting method. The inflation method, for example, can give tube-shaped films by melt mixing the main starting material, etc. and then blowing it up from a circular die. The casting method can give films by melt mixing the main starting material, etc. and then extruding it from a die on a chilled roll (cold roll). In a modified form of this casting method, the additives may be removed by washing off with a suitable solvent after extrusion of the melted mixture on the chilled roll.

The formed plastic film is then stretched to provide it with fine voids. As with the film forming, the stretching may also be carried out according to common methods, such as uniaxial stretching or biaxial stretching. For example, in the case of biaxial stretching, the stretching in the lengthwise direction may be accomplished by varying the speed

of the driving roll, and the stretching in the widthwise direction may be accomplished by mechanical pulling in the widthwise direction while holding both ends of the film with a chuck.

The conditions for the film stretching are not particularly restricted, but the stretching is preferably carried out so as to give a void content in the range of 5-50% and a stretched film thickness in the range of 5-200 μm . If the void content upon stretching of the film is under 5% the amount of oil absorption will be reduced, while if it is over 50% the amount of oil absorption will be too great, making it difficult to clearly assess the oil absorbing effect. Also, if the film thickness is under 5 μm the amount of oil absorption will be too low and the film will tend to adhere to areas of the face which require no removal of oils, making it more difficult to handle, while if it is over 200 μm the amount of oil absorption will be too great.

The stretching ratio for the plastic film is usually preferred to be in the range of 1.5 to 3.0. If the stretching ratio is under 1.5 it becomes impossible to achieve a sufficient void content for oil absorption, while if it is over 3.0 the void content becomes too large, causing too much oil absorption.

The size of the voids formed by stretching of the film is usually preferred to be in the range of 0.2 to 5 μm . If the void size is under 0.2 μm it becomes impossible to absorb enough skin oil to create transparency, while if it is over 5 μm the amount of oil absorption will be too great.

As mentioned above, the interstitial volume per unit area of the porous stretched plastic film obtained by the stretching process described earlier is preferably in the range of 0.0001-0.005 cm^3 , and more preferably in the range of 0.0002-0.001 cm^3 , as calculated by the equation defined above. If the interstitial volume of the film is under 0.0001 cm^3 it becomes difficult for the user to hold the oil cleaning sheet, while if it is over 0.005 cm^3 the amount of oil absorption is

too great, and it becomes difficult to clearly assess the oil absorbing effect.

[Examples]

The present invention will now be explained in further detail by way of examples. In the following examples, the term "parts" refers to "parts by weight" unless otherwise specified. It is also to be understood that the invention is in no way limited to these examples.

Example 1

The following starting material was melt mixed in the amounts listed.

Polypropylene resin (available from Union Carbide Co. under trade name "5D45")	63.3 parts
Mineral oil (available from Amoco Oil & Chemical Co. under trade name "White Mineral Oil #31")	34.0 parts
Organic nucleating agent (available from Hoechst Celanese under trade name "Blue P-526")	2.75 parts

The melt mixture was then cast from an extrusion die onto a cold roll to form a film. The resulting film was subjected to biaxial stretching (180% in lengthwise direction, 180% in widthwise direction). A porous stretched plastic film was obtained having the following characteristics.

Film thickness	0.0035 cm
Void content	25%
Interstitial volume per unit area	0.000875 cm ³

The resulting porous film was cut into a rectangle of 9 cm length x 6 cm width to make a test film which was subjected to quality evaluation with regard to (1) oil absorption, (2) transparency after use and (3) feel of the film, according to the following methods.

(1) Evaluation of oil absorption

After measuring the weight (mg) of the test film, it was impregnated with commercially available mineral oil. After standing for one minute, the residual oil on the surface of the film was wiped off with a paper towel and the weight (mg) of the test film was measured again. The change in the weight

of the film due to impregnation of the mineral oil was used to determine the amount of absorption per unit area (mg/cm^2) and the theoretical absorption (amount of absorption when all of the interstitial of the film are filled with mineral oil, mg/cm^2).

(2) Transparency after use

Test films were used as oil cleaning sheets for makeup in a monitoring test with 20 panelists. After use, the films with very excellent transparency were assigned as excellent (\odot), those with good transparency were assigned as good (\circ), those with acceptable transparency were assigned as fair (Δ) and those with inferior transparency were assigned as poor (\times).

(3) Feel of film

Test films were used as oil cleaning sheets for makeup in a monitoring test with 20 panelists. After use, the films with a very excellent feel were assigned as excellent (\odot), those with a good feel were assigned as good (\circ), those with an acceptable feel were assigned as fair (Δ) and those which were stiff with an inferior feel were assigned as poor (\times).

The results of each of the evaluation tests were as follows.

Film weight (before oil absorption)	121 mg
Film weight (after oil absorption)	174 mg
Change in weight (increase)	53 mg
Oil absorption per unit area	$0.98 \text{ mg}/\text{cm}^2$
Theoretical absorption	$0.73 \text{ mg}/\text{cm}^2$
Transparency after use	excellent (\odot)
Feel	excellent (\odot)

As these results demonstrate, the porous stretched plastic film of this example was highly suitable as an oil cleaning sheet for makeup. There was also no tearing of the film during the evaluation tests.

Example 2

The method described in Example 1 was repeated. For this example, however, the following starting material was melt

mixed in the amounts listed.

Polypropylene resin (available from Union Carbide Co. under trade name "5D45")	62.0 parts
Mineral oil (available from Amoco Oil & Chemical Co. under trade name "White Mineral Oil #31")	35.0 parts
Pigment (available from PMS Consolidate Co. under trade name "18P805 Blue Pigment")	3.0 parts
Organic nucleating agent (available from Milliken Chemical Co. under trade name "Millad 3905")	0.08 part

In this example, the porous stretched plastic film was prepared using the inflation method instead of the casting method of Example 1, and a tube-shaped film was made by blowing-up the melted mixture from a circular die, which film was then cut into 2 sheet-like films. Each resulting film was then subjected to uniaxial stretching (160% in lengthwise direction).

The characteristics of the resulting porous stretched plastic film and the results of each of the evaluation tests were as follows.

Film thickness	0.0035 cm
Void content	20%
Interstitial volume per unit area	0.0007 cm ³
Film weight (before oil absorption)	172 mg
Film weight (after oil absorption)	211 mg
Change in weight (increase)	39 mg
Oil absorption per unit area	0.72 mg/cm ²
Theoretical absorption	0.59 mg/cm ²
Transparency after use	excellent (◎)
Feel	excellent (◎)

As these results demonstrate, the porous stretched plastic film of this example was highly suitable as an oil cleaning sheet for makeup. There was also no tearing of the film during the evaluation tests.

Example 3

The method described in Example 1 was repeated. For this example, however, the following starting material was melt

mixed in the amounts listed.

Polypropylene resin (available from Union Carbide Co.

under trade name "DX5E98") 79.0 parts

Mineral oil (available from Amoco Oil & Chemical Co.

under trade name "White Mineral Oil #31") 21.0 parts

Organic nucleating agent (available from Milliken

Chemical Co. under trade name "Millad 3905") 0.09 part

In this example, the porous stretched plastic film was prepared using the inflation method instead of the casting method of Example 1, and a tube-shaped film was made by blowing-up the melted mixture from a circular die, which film was then cut into 2 sheet-like films. Each resulting film was then subjected to uniaxial stretching (160% in lengthwise direction).

The characteristics of the resulting porous stretched plastic film and the results of each of the evaluation tests were as follows.

Film thickness	0.0075 cm
Void content	20%
Interstitial volume per unit area	0.0015 cm ³
Film weight (before oil absorption)	281 mg
Film weight (after oil absorption)	338 mg
Change in weight (increase)	57 mg
Oil absorption per unit area	1.06 mg/cm ²
Theoretical absorption	1.26 mg/cm ²
Transparency after use	fair (Δ)
Feel	good (○)

As these results demonstrate, the porous stretched plastic film of this example was usable as an oil cleaning sheet for makeup, although its properties were inferior to those of the films of Examples 1 and 2 above. There was also no tearing of the film during the evaluation tests.

Example 4

This example was carried out as a comparative example.

The method described in Example 1 was repeated. For comparison in this example, however, the following starting

material was melt mixed in the amounts listed.

Polyethylene resin (available from Fina Oil and Chemical Co. under trade name "Fina 1285")	38.0 parts
Mineral oil (available from Witco Co. under trade name "Witco Protol")	62.0 parts

In this example, the porous stretched plastic film was prepared using a modified casting method instead of the casting method of Example 1. Specifically, a film was made by casting the melted mixture from an extrusion die onto a cold roll, and then dissolving off the mineral oil with an organic solvent. The resulting film was then subjected to biaxial stretching (240% in lengthwise direction, 280% in widthwise direction).

The characteristics of the resulting porous stretched plastic film and the results of each of the evaluation tests were as follows.

Film thickness	0.005 cm
Void content	75%
Interstitial volume per unit area	0.004 cm ³
Film weight (before oil absorption)	65 mg
Film weight (after oil absorption)	269 mg
Change in weight (increase)	204 mg
Oil absorption per unit area	3.78 mg/cm ²
Theoretical absorption	3.14 mg/cm ²
Transparency after use	fair (Δ)
Feel	good (○)

As these results demonstrate, the porous stretched plastic film obtained in this example was usable as an oil cleaning sheet for makeup, although its properties were inferior to those of the films of Examples 1 and 2 above.

Example 5

This example was carried out as a comparative example.

The method described in Example 1 was repeated. For comparison in this example, however, the following starting material was melt mixed in the amounts listed.

Polypropylene resin (available from Shell Chemical Co.

under trade name "DS 5D45")	30.0 parts
Mineral oil (available from Amoco Oil & Chemical Co. under trade name "White Mineral Oil #31")	70.0 parts
Organic nucleating agent (available from Milliken Chemical Co. under trade name "Millad 3905")	0.08 part

In this example, the porous stretched plastic film was prepared using a modified casting method instead of the casting method of Example 1. Specifically, a film was made by casting the melted mixture from an extrusion die onto a cold roll, and then dissolving off the mineral oil with an organic solvent. The resulting film was then subjected to biaxial stretching (180% in lengthwise direction, 270% in widthwise direction).

The characteristics of the resulting porous stretched plastic film and the results of each of the evaluation tests were as follows.

Film thickness	0.011 cm
Void content	84%
Interstitial volume per unit area	0.00924 cm ³
Film weight (before oil absorption)	90 mg
Film weight (after oil absorption)	550 mg
Change in weight (increase)	460 mg
Oil absorption per unit area	3.52 mg/cm ²
Theoretical absorption	7.74 mg/cm ²
Transparency after use	poor (x)
Feel	good (o)

As these results demonstrate, the porous stretched plastic film obtained in this example was usable as an oil cleaning sheet for makeup, although assessment of its effect was very difficult and its properties were inferior to those of the films of Examples 1 and 2 above.

Example 6

This example was carried out as a reference example.

For reference, the 3 different oil cleaning sheets for makeup described below (commercially available) were provided for quality evaluation by the methods described in Example 1.

The characteristics of the oil cleaning sheets for makeup and the results of each of the evaluation tests were as follows.

Oil cleaning sheet for makeup by Y Co. (gold foil embossed sheet)

Sheet thickness	0.0025 cm
Void content	--
Interstitial volume per unit area	--
Sheet weight (before oil absorption)	121 mg
Sheet weight (after oil absorption)	136 mg
Change in weight (increase)	15 mg
Oil absorption per unit area	0.27 mg/cm ²
Theoretical absorption	--
Transparency after use	good (o)
Feel	fair (Δ)

Oil cleaning sheet from makeup by K Co. (natural plant fiber)

Sheet thickness	0.0025 cm
Void content	--
Interstitial volume per unit area	--
Sheet weight (before oil absorption)	86 mg
Sheet weight (after oil absorption)	104 mg
Change in weight (increase)	18 mg
Oil absorption per unit area	0.33 mg/cm ²
Theoretical absorption	--
Transparency after use	good (o)
Feel	good (o)

Oil cleaning sheet for makeup by S Co. (100% natural pulp, containing natural manila hemp)

Sheet thickness	0.0002 cm
Void content	--
Interstitial volume per unit area	--
Sheet weight (before oil absorption)	83 mg
Sheet weight (after oil absorption)	100 mg
Change in weight (increase)	17 mg
Oil absorption per unit area	0.31 mg/cm ²
Theoretical absorption	--
Transparency after use	good (o)

Feel

good (o)

As these results demonstrate, the oil cleaning sheets for makeup in this example which were tested for reference were usable as oil cleaning sheets for makeup, but their properties were inferior to those of the films of Examples 1 and 2 above. [Effect of the Invention]

As explained above, according to the present invention an oil cleaning sheet for makeup is constructed not of conventional fiber material paper but is formed of a porous film made of a plastic material, with fine voids provided in the film to cause adsorption of oils which have surfaced on the face; it is therefore possible to realize high absorption of oils, to clearly assess the absorbing effect based on the excellent transparency of the oil absorbing areas and to thus provide the user with a feeling of adequate wiping and a sense of satisfaction, while the sheet has an agreeable feel, is resistant to damage during use, and requires no inclusion of particulate bodies on the surface for improved characteristics.

[NAME OF DOCUMENT]

ABSTRACT

[SUMMARY]

[OBJECT]

To provide an oil cleaning sheet for makeup which has excellent oil absorption, allows clear assessment of the oil absorbing effect by becoming transparent upon oil absorption, thus providing the user with a feeling of adequate wiping and a sense of satisfaction, has an agreeable feel, is resistant to damage during use and which does not require inclusion of particulate bodies on the surface.

[SOLUTION MEANS]

The oil cleaning sheet consists of a porous stretched film made of a plastic material.

[SELECTED DRAWING] None